



Sub-Orbital Technical Studies at Flight Test Wing

SPACE | AEROSPACE | AIR

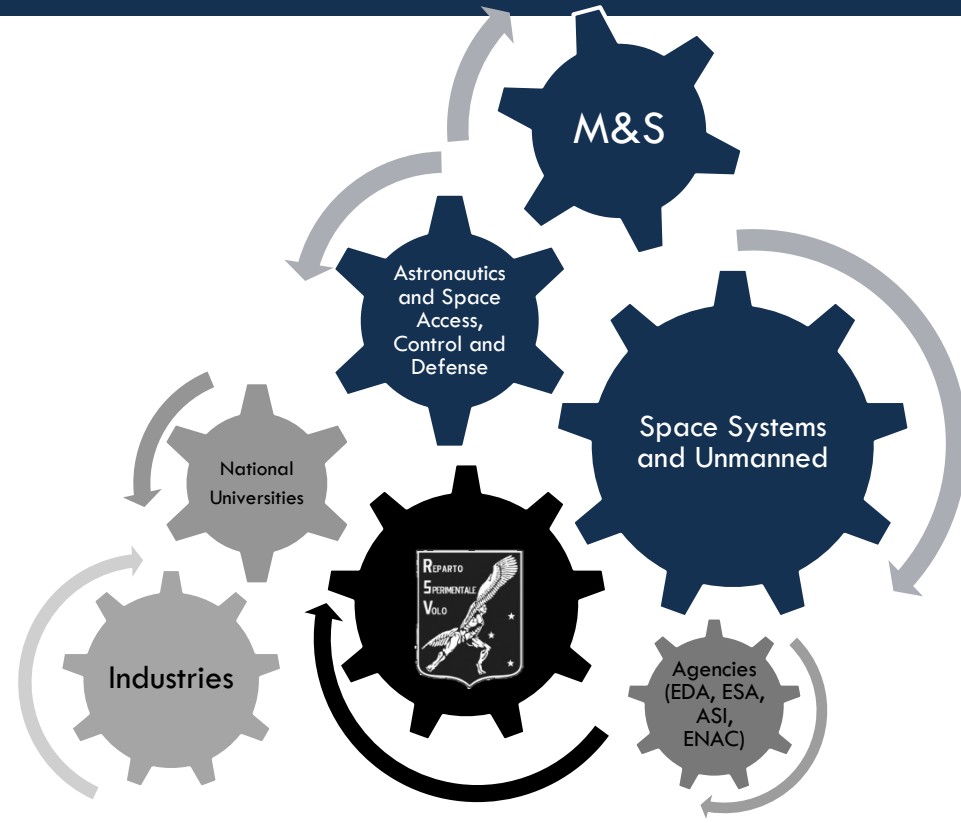
Montreal, 18 March 2015

Maj. Ferdinando DOLCE, PhD
Head of Aero-Space System Engineering Group - Italian Air Force

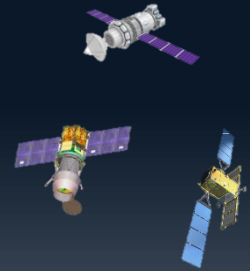


RSV toward the aero-space domain

- *Gruppo Ingegneria per l'AeroSpazio* (Aero-Space System Engineering Group) of RSV (Flight Test Wing) is the technological enabler of ItAF space and aerospace policy
- NDA signed with *Swiss Space Systems (S3)*
- NDA in progress with *XCOR*
- LoA signed between ItAF and *Sierra Nevada Corporation*



SPACE

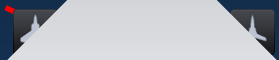
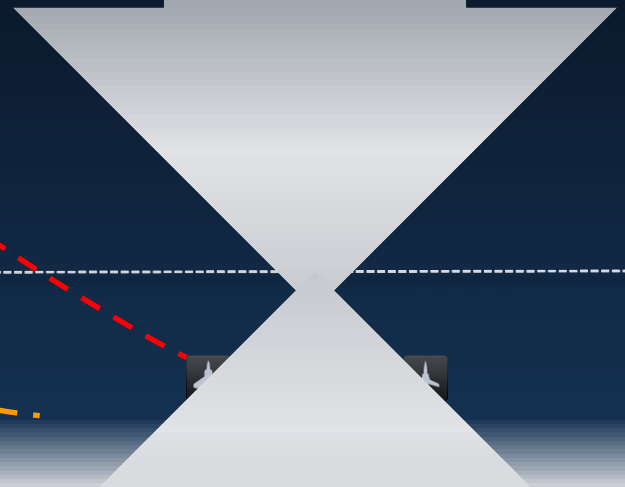
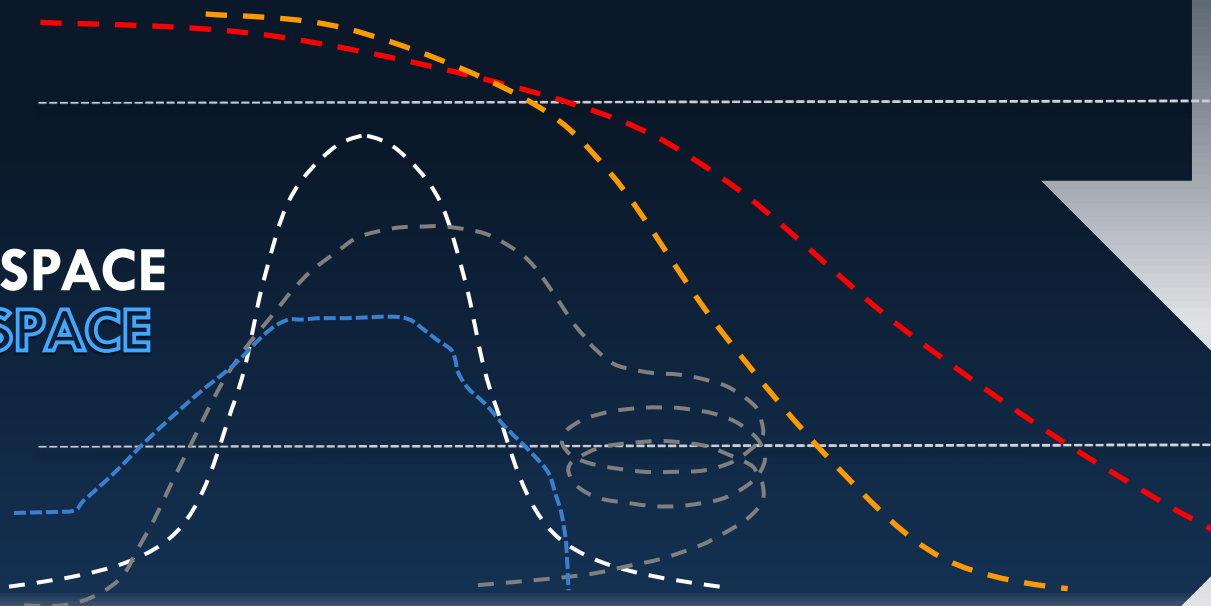


325 kft/100 km

NEAR SPACE AEROSPACE

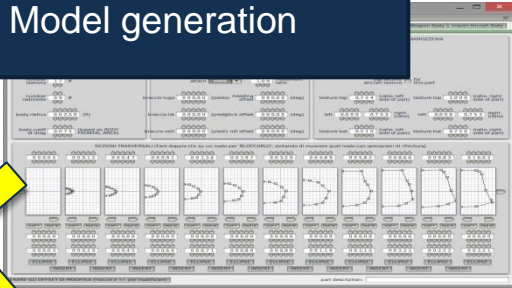
65 kft/18 km

AIR

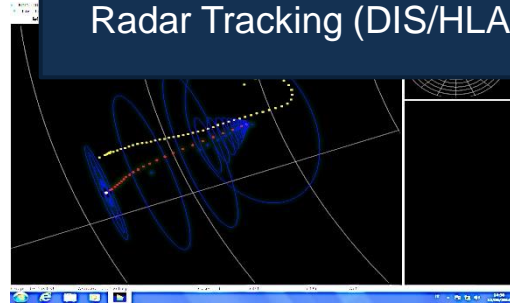


Flight model/M&S interfacing

Model generation



Radar Tracking (DIS/HLA)



Aerodynamic
Model/Flight simulator

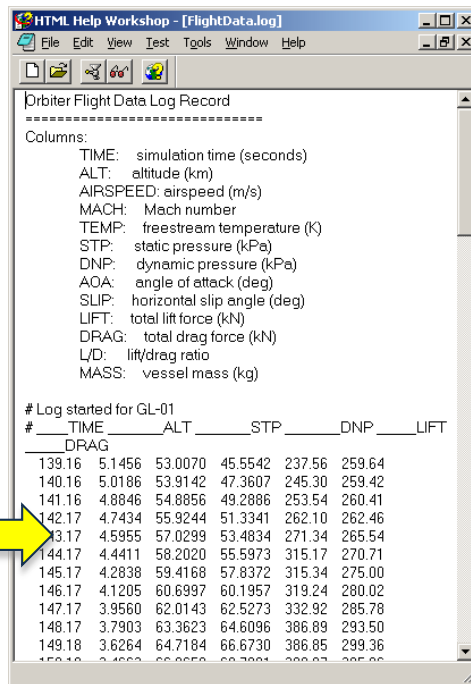
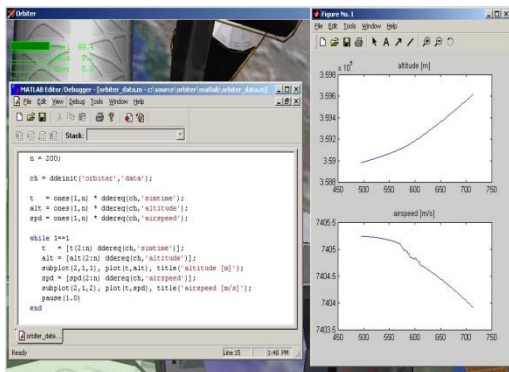


STK (Satellite Tool Kit)

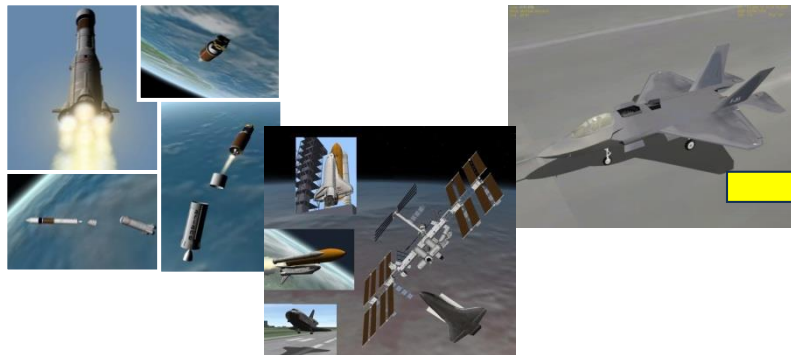
X-Plane to STK interface



Plugin developed by ItAF

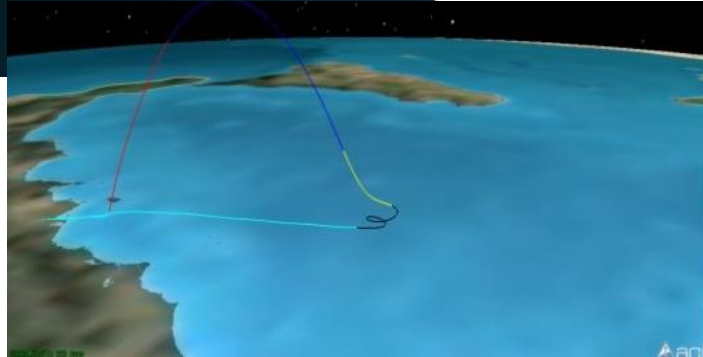
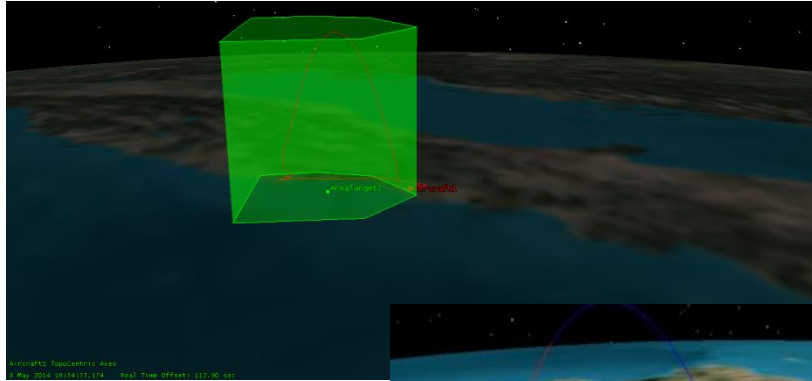


- Data logging plugin
- STK Interface plugin
- DIS/HLA Orbiter plugin

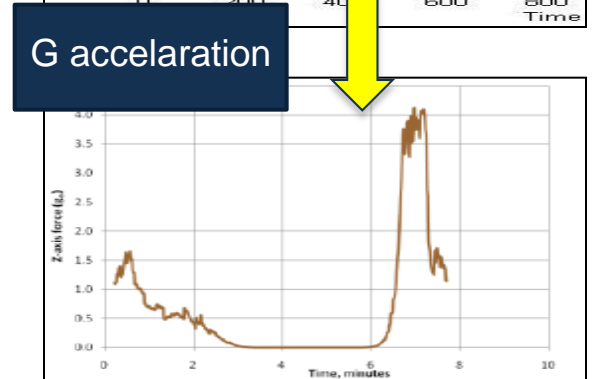
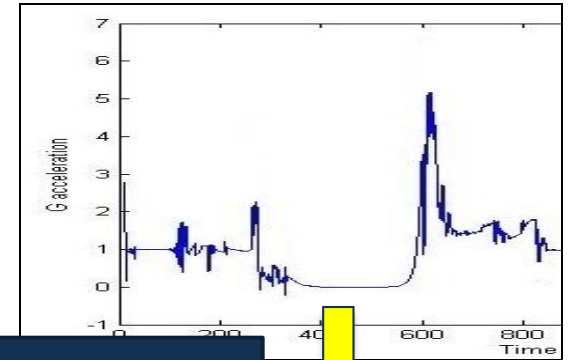
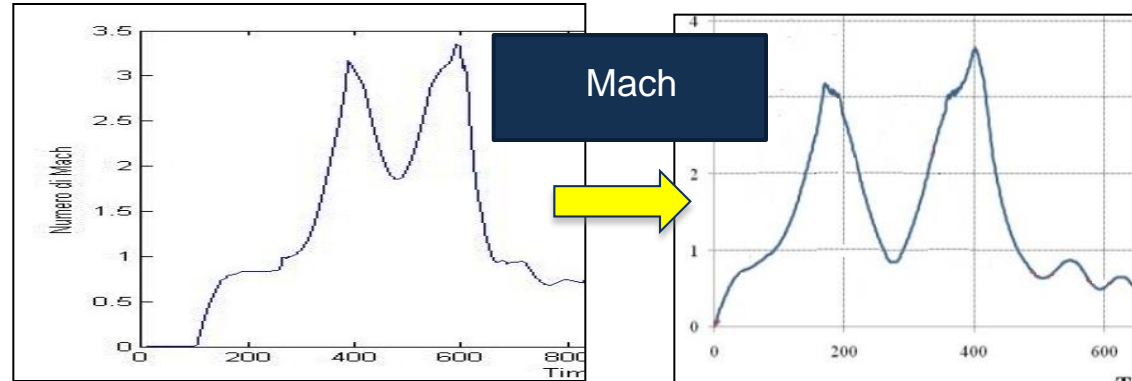
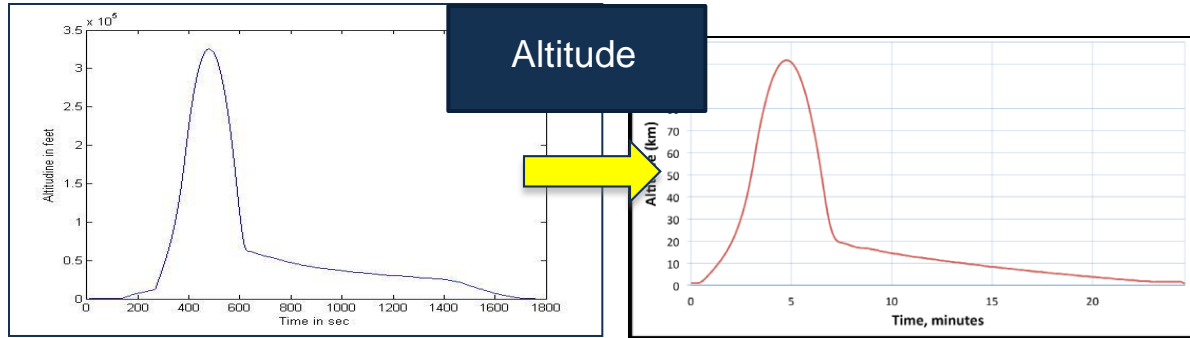




Flight profile in the Italian air-space



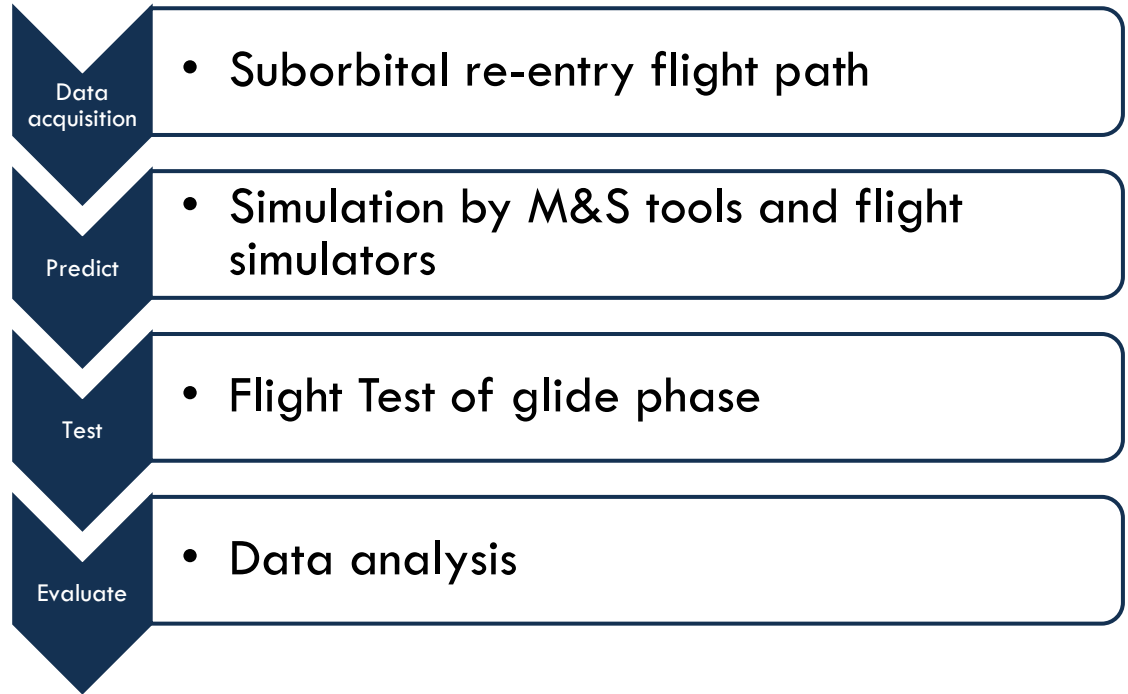
Flight model validation



Development Test & Evaluation at Flight Test Wing



DT&E with the aim to
evaluate the
performance of
Italian Air Force
aircrafts to replicate
glide re-entry phase
for training missions



ItAF Flight Test training at Edwards AFB



A **T-38 A** was used as airborne simulator with gear down and speedbrake out:

1. **X-24B:** 4 L/D at 200 kias, 2.5 L/D at 300 kias (constant Mach 0.5)
2. **Space Shuttle:** 4 L/D (fpa 14), 2 L/D (fpa 27), dependent on the shuttle configuration and speedbrake deflection
3. **T-38 A:** 2.5 L/D, 300 kias with gear down, descent rate up to 12000 fpm at flare

FUEL	25K	15K	7K
3000	73	73	73
2500	74	74	77
2000	75	78	81
1500	77	80	85
1000	78	83	88

X-24B

Space Shuttle



FUEL#	LOW KEY ALT
3000	18.0K
2500	18.5K
2000	19.0K
1800	19.5K
1600	20.0K
1400	20.5K
1200	21.5K
1000	22.5K
800	24.0K



14-Dec-06

Flight Test feasibility study on ItAF aircrafts is on going...



- Both simulation and flight test in order to verify a mission “T38-like”

Configuration
Engine
Airbrake
Gear & Flap
Best L/D
Speed & Alpha

MB 339 CD



AMX



T346





Conclusions

- *Aero-Space System Engineering Group represents a new technical reference point for aero-space and space studies and analysis in Italian Air Force*
- *These preliminary simulations showed a very good agreement with available technical data*
- *Further technical studies and flight test feasibility analysis are now on-going in order to improve ItAF sub-orbital capability*



Thank you for your attention

Maj. Ferdinando DOLCE, PhD

Head of Aero-Space System Engineering Group

ferdinando.dolce@am.difesa.it

+39 06 9129 3138

